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(54) METHODS AND SYSTEMS FOR CONTROLLED PRINTING OF DOCUMENTS INCLUDING SENSITIVE INFORMATION

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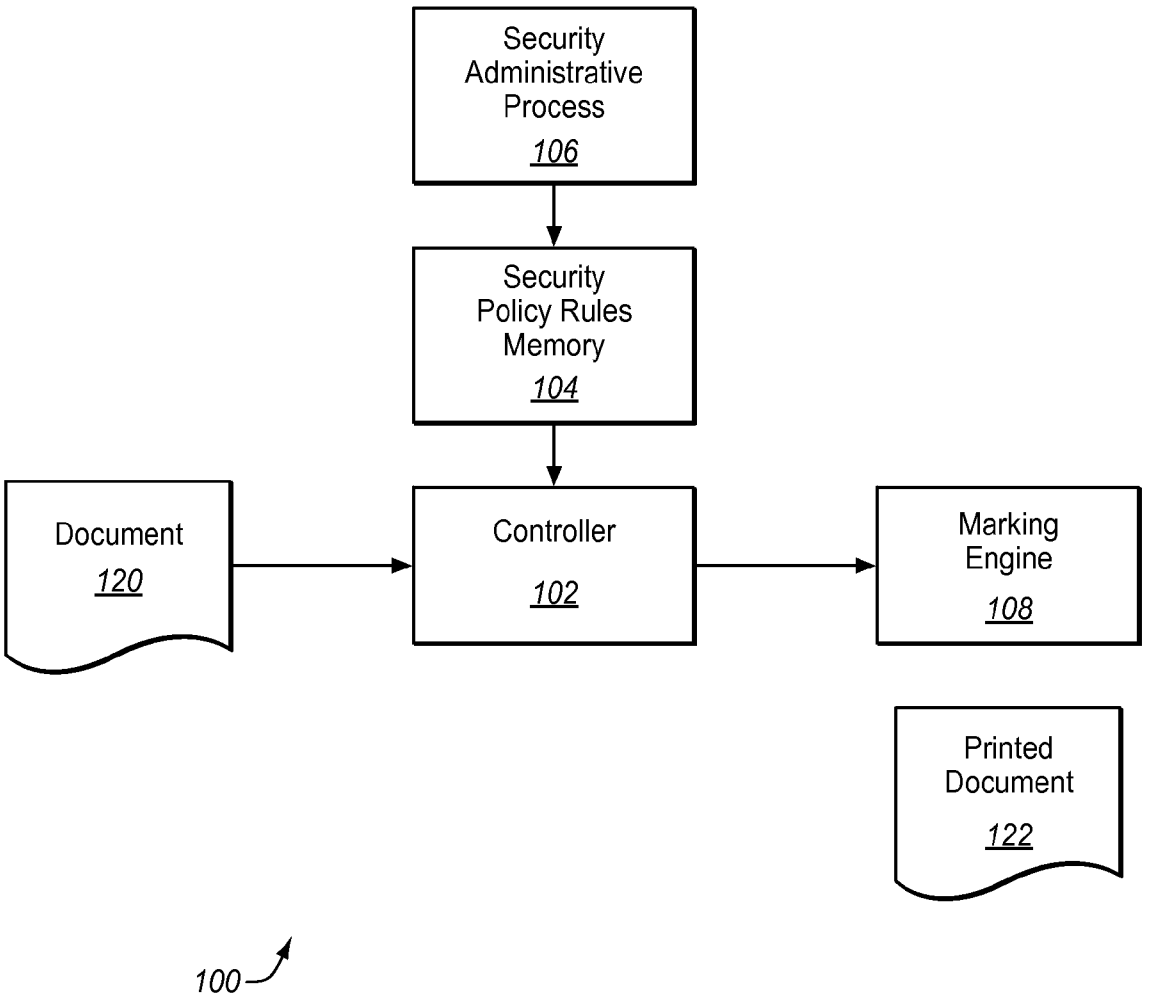
(57) **ABSTRACT**

Methods and systems for controllably printing documents including sensitive information. Features and aspects hereof provide a controller coupled to the marking engine. The controller applies rules to automatically detect the presence of sensitive information in a document to be printed and actions to securely print the document. Each rule includes a list of words and/or phrases deemed sensitive in the printing environment and actions to be taken when any of those words or phrases are detected. The actions may define, for example, that a user must enter authentication credentials at the marking engine to indicate that the user is physically present at the marking engine to receive the document printed. The rules may also specify, for example, that portions of the document detected as containing the sensitive information may be automatically modified/redacted by the controller prior printing the document.



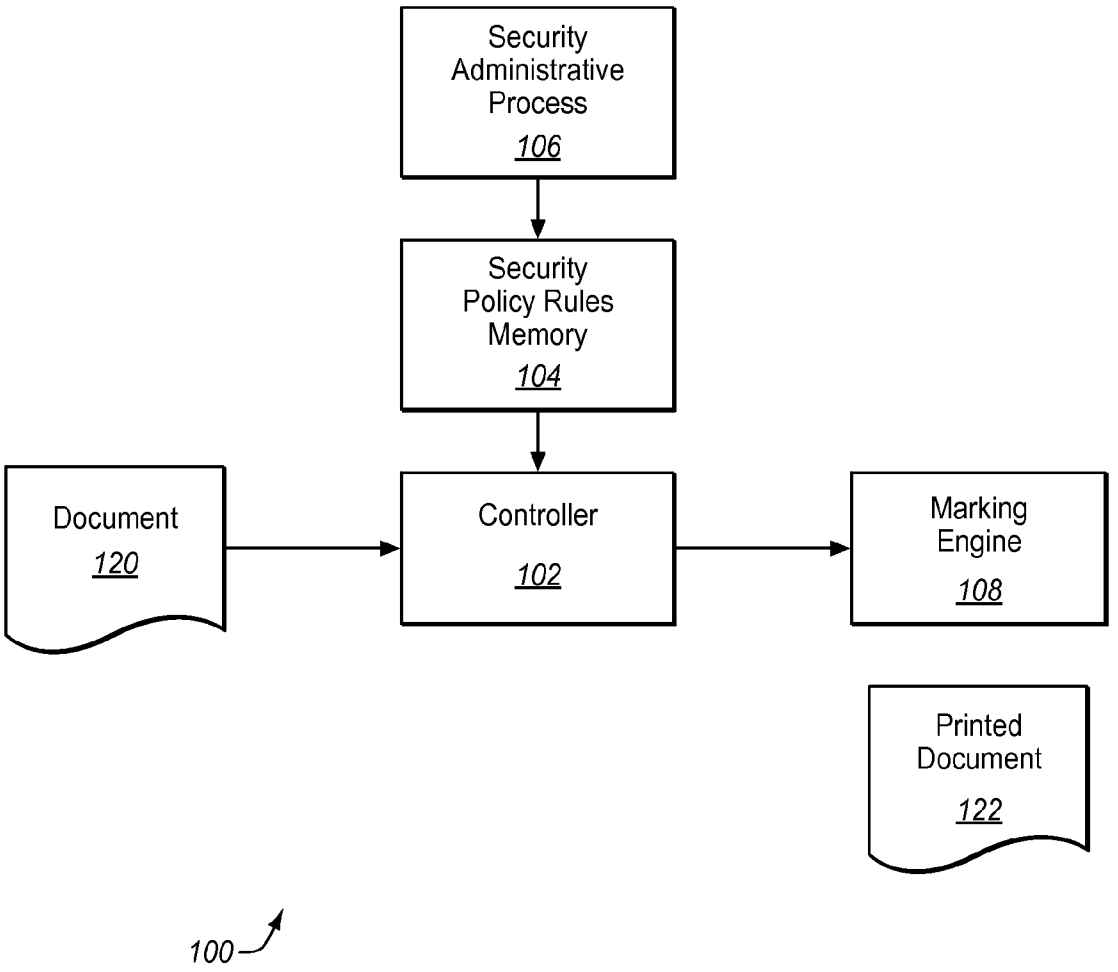

Security Administrative Process
106
Security Policy Rules Memory
104
Document
120
Controller
102
Marking Engine
108
Printed Document
122
100

FIG. 1

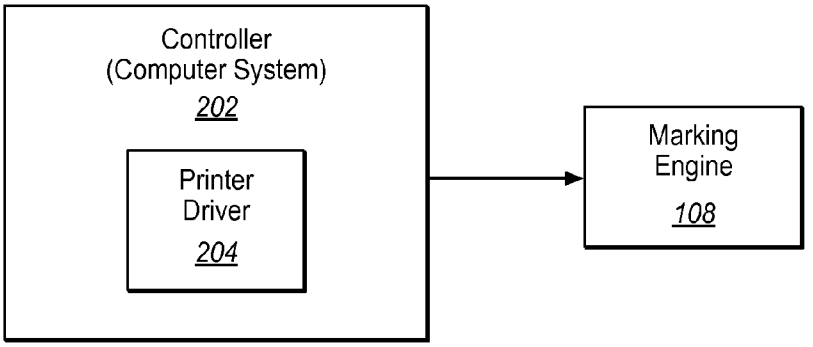


FIG. 2

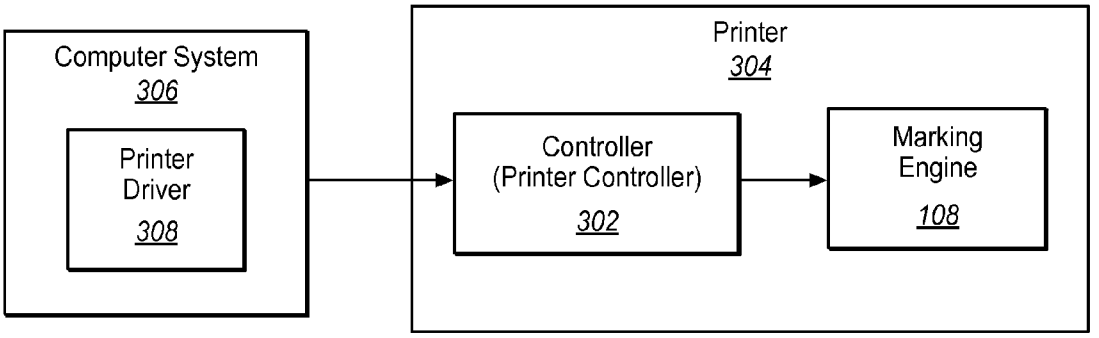


FIG. 3

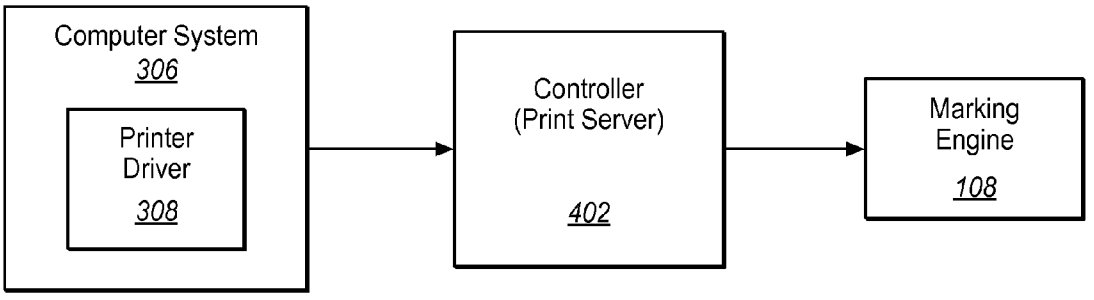


FIG. 4

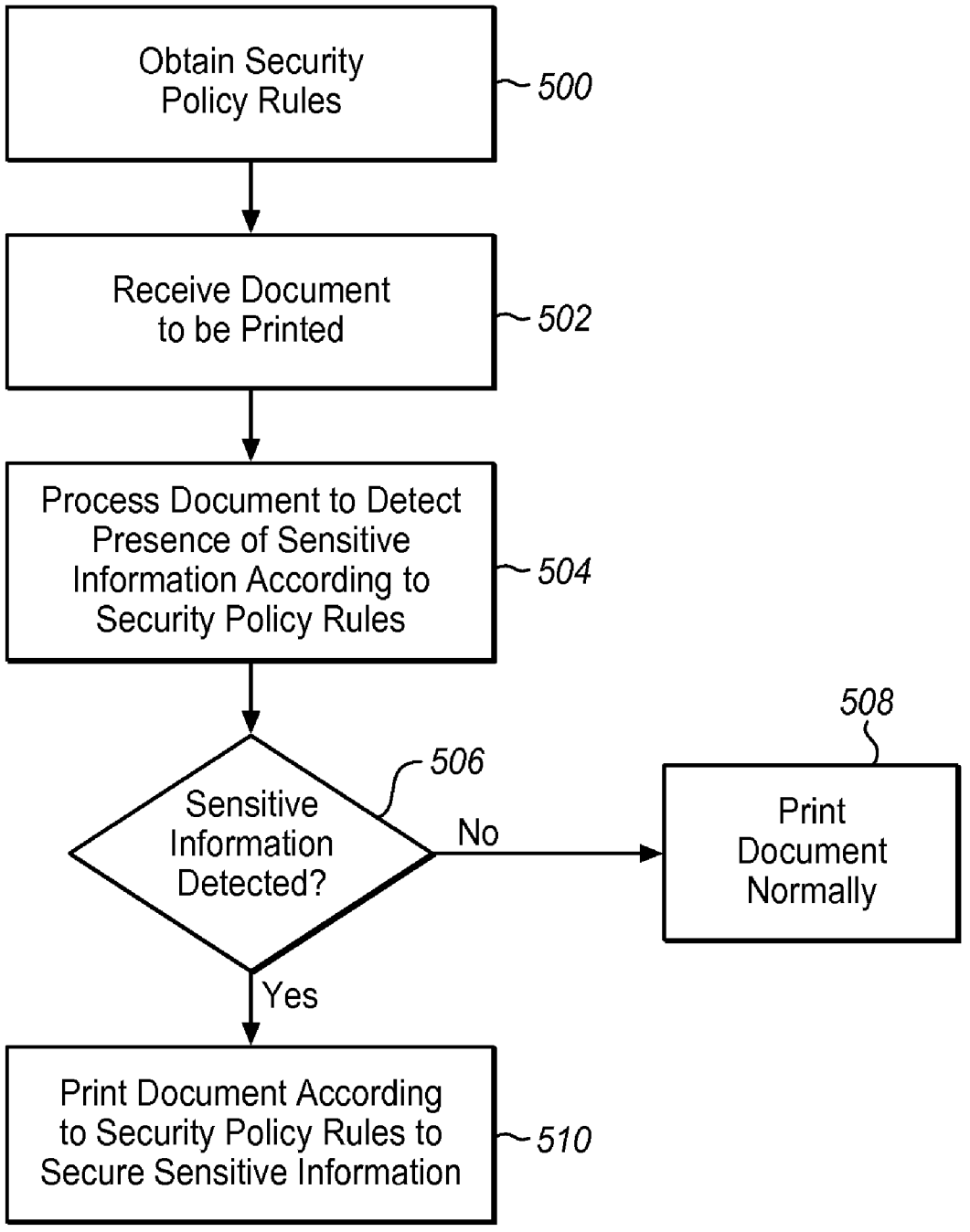

Obtain Security Policy Rules
500
Receive Document to be Printed
502
Process Document to Detect Presence of Sensitive Information According to Security Policy Rules
504
Sensitive Information Detected?
506
No
Yes
Print Document Normally
508
Print Document According to Security Policy Rules to Secure Sensitive Information
510

FIG. 5

FIG. 6

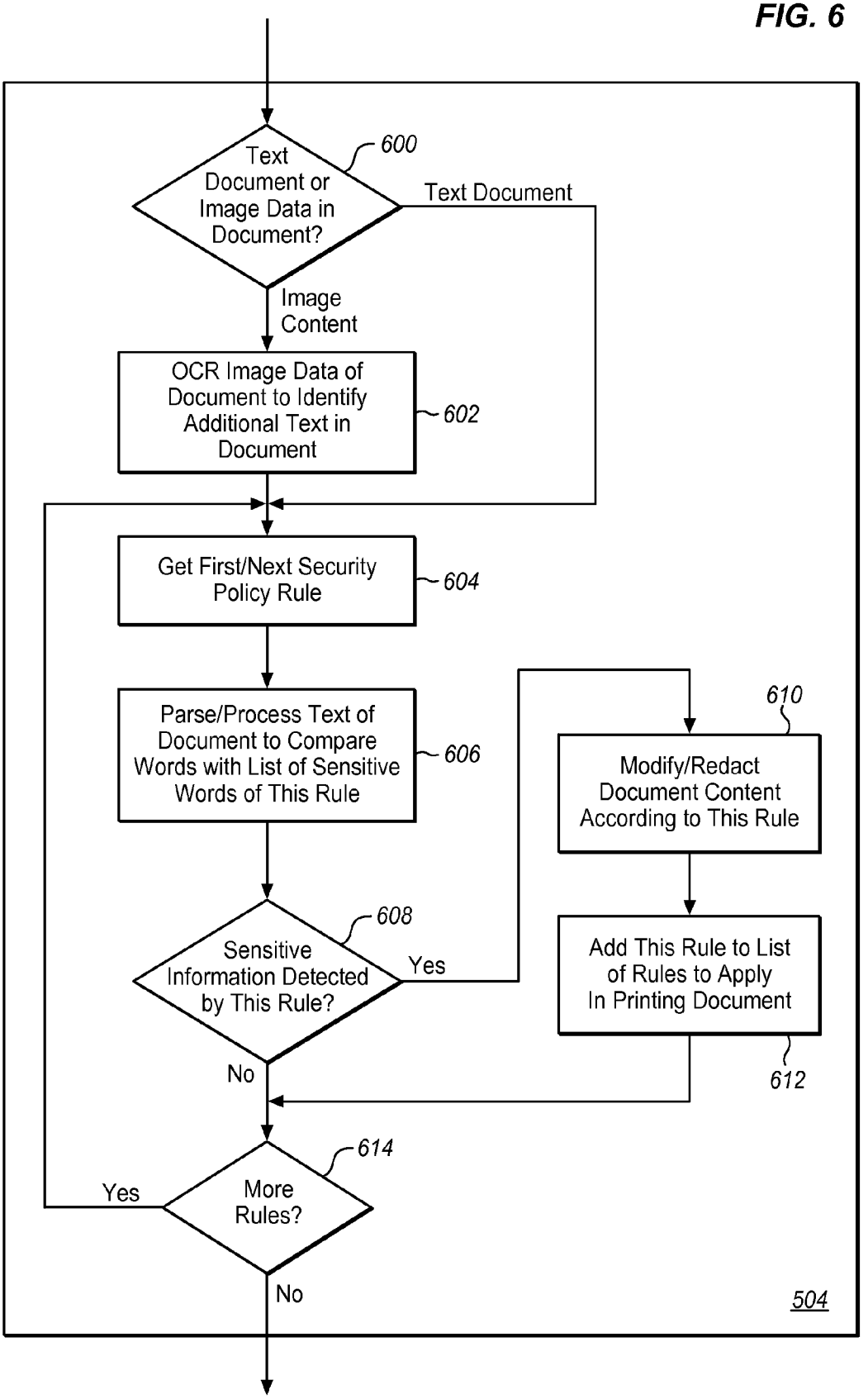
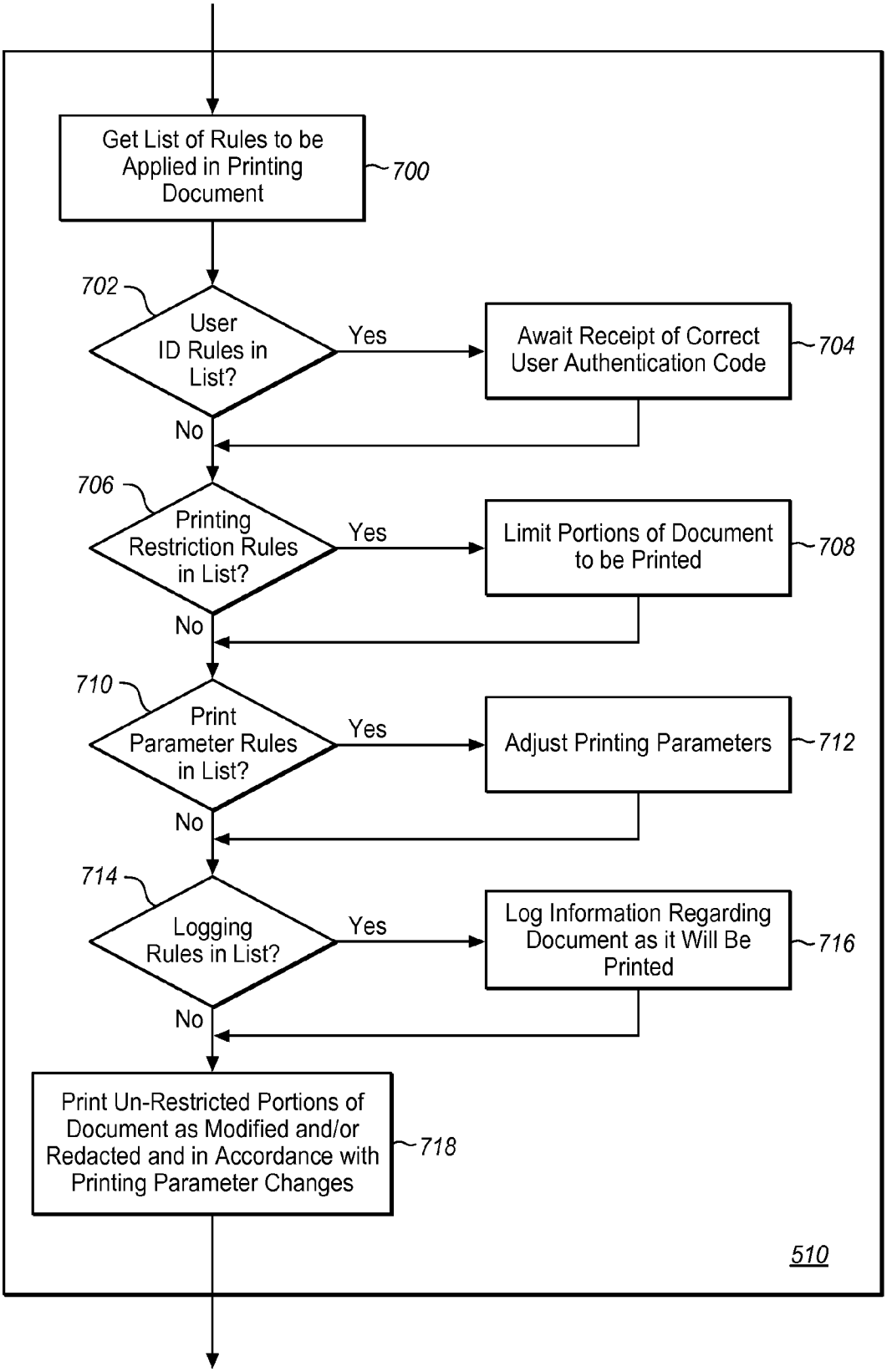

Text Document or Image Data in Document?
600
Text Document
Image Content
OCR Image Data of Document to Identify Additional Text in Document
602
Get First/Next Security Policy Rule
604
Parse/Process Text of Document to Compare Words with List of Sensitive Words of This Rule
606
Sensitive Information Detected by This Rule?
608
Yes
No
Modify/Redact Document Content According to This Rule
610
Add This Rule to List of Rules to Apply In Printing Document
612
More Rules?
614
Yes
No
504

FIG. 7


Get List of Rules to be Applied in Printing Document
700
702
User ID Rules in List?
Yes
Await Receipt of Correct User Authentication Code
704
No
706
Printing Restriction Rules in List?
Yes
Limit Portions of Document to be Printed
708
No
710
Print Parameter Rules in List?
Yes
Adjust Printing Parameters
712
No
714
Logging Rules in List?
Yes
Log Information Regarding Document as it Will Be Printed
716
No
Print Un-Restricted Portions of Document as Modified and/or Redacted and in Accordance with Printing Parameter Changes
718
510

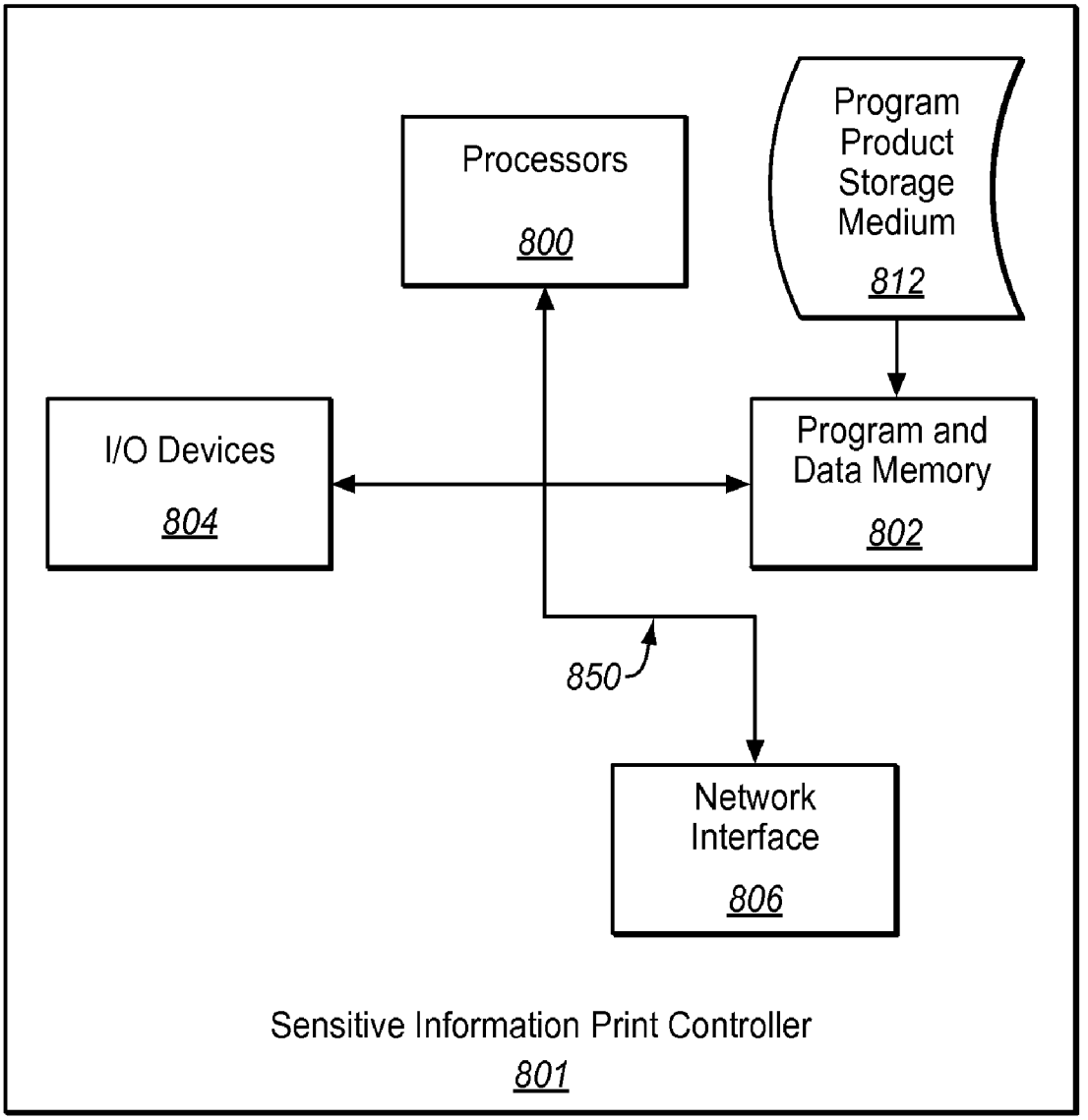

Processors
800
Program Product Storage Medium
812
I/O Devices
804
Program and Data Memory
802
850
Network Interface
806
Sensitive Information Print Controller
801

FIG. 8

METHODS AND SYSTEMS FOR CONTROLLED PRINTING OF DOCUMENTS INCLUDING SENSITIVE INFORMATION

BACKGROUND

[0001] 1. Field of the Invention

[0002] The invention relates generally to processing of print jobs including sensitive information. More specifically, the invention relates to methods and systems for improving security measures when printing documents including sensitive information.

[0003] 2. Discussion of Related Art

[0004] Computer generated output may be directed through a printer driver in the computer system to printing devices as capable of imprinting the output on a printable medium. In a variety of such printing applications, sensitive information may be included in the computer generated output (e.g., "document") to be printed. It is important in many such environments to assure that only the properly authorized users retrieve the printed output from the printing the device. Or, it may be important that if the document is printed, sensitive information must be modified or redacted. For example, documents including confidential information should be printed only when an authorized user is standing ready at the printing system to receive the confidential printed output. Examples of such confidential information may include secret information in classified document production environments, salary or other human resources information within a corporate environment, identification information such as Social Security numbers or other critical identification information, etc.

[0005] As presently practiced in the art, the user of the computer system generating the sensitive information is responsible for determining that the printing system should secure the printed output until the user is present at the printing system to receive the output. The user may, for example, indicate an option in the request for printing signifying a particular password or code to be entered at the printing system indicating that the user is standing ready to receive the sensitive printed information. Or, the user must manually consider what information is sensitive and then manually modify the document to redact such sensitive information before requesting that the document be printed. However, if the user simply forgets to set the appropriate option or fails to realize that sensitive information in the document should be secured, the printed output may be generated by the printing system without the authorized user being present to receive the printed output. Thus sensitive information may be retrieved by unauthorized personnel from the printing system before the authorized user is standing by ready to receive the printed output.

[0006] It is evident from the above discussion that a need exists for improved methods and systems for securing sensitive information in a document to be printed.

SUMMARY OF THE INVENTION

[0007] The present invention solves the above and other problems, thereby advancing the state of the useful arts, by providing methods and systems for automating security for printing of documents including sensitive information. Features and aspects hereof include a capability to automatically parse or otherwise analyze a document to be printed and, responsive to detecting sensitive information in a document, modifying the content of the document and/or forcing the user to supply authentication credentials to be entered at the printing system indicating the authorized user is present to receive a sensitive printed material. The automatic recognition of sensitive information in a document to be printed may be performed within the user's computer system such as within an enhanced printer driver, or may be performed by a printer server network appliance, or by the printer itself through its printer controller. Recognition of sensitive information may comprise parsing the text in a document to be printed to recognize any of various defined sensitive keywords or phrases. Further, the recognition of sensitive information may also include optical character recognition (OCR) of a document image followed by parsing for sensitive information included within the converted text of imaged document.

[0008] In one aspect, a method is provided for securing the printing of documents including sensitive information. The method includes providing security policy rules for printing of documents including sensitive information and automatically detecting the presence of sensitive information in a document to be printed based on the rules. The method then prints the document, responsive to detecting the presence of sensitive information, according to the security policy rules to secure the sensitive information from unauthorized use.

[0009] In another aspect, a system is provided including a marking engine for imprinting information on a printable medium and a controller coupled to the marking engine for controlling the printing of documents including sensitive information on the marking engine. The system further includes a memory, coupled to the controller, storing security policy rules for printing of documents including sensitive information. The controller is adapted to automatically detect the presence of sensitive information in a document to be printed based on the rules. The controller is further adapted to print the document, responsive to detecting the presence of sensitive information, according to the security policy rules to secure the sensitive information from unauthorized use.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. **1** is a block diagram of an exemplary system incorporating features and aspects hereof to print documents in a manner to secure sensitive information contained in the document.

[0011] FIGS. **2** through **4** are block diagrams showing exemplary physical embodiments of the controller of FIG. **1**

[0012] FIGS. **5** through **7** are flowcharts describing exemplary methods in accordance with features and aspects hereof.

[0013] FIG. **8** is a block diagram of a controller adapted to process methods hereof embodied in a computer readable medium in accordance with features and aspects hereof.

DETAILED DESCRIPTION OF THE DRAWINGS

[0014] FIG. **1** is a block diagram showing an exemplary system **100** embodying features and aspects hereof providing for controlled printing of documents including the sensitive or secure information. Controller **102** of system **100** is coupled to a suitable memory **104** in which security policy rules are stored. Controller **102** receives a document **120** from any appropriate source such as a host system running an application program generating document **120**. Controller **102** is adapted to process each of the rules specified in memory **104** to determine restrictions or modifications appro-

priate to printing document **120** if the application of the rule detects the presence of sensitive information in the document **120**. Each rule in memory **104** may specify, for example, a list of words or phrases that may be deemed sensitive information and thus require that the document be printed with corresponding security actions. By way of example, a rule may specify that documents including numbers that appear to be social security numbers, bank account numbers, or other financial account numbers should be printed in a secure manner. Such a rule would then specify what actions should be taken by controller **102** to assure secure printing of the document in accordance with rules of the particular printing environment.

[0015] Controller **102** may modify the document **120** in accordance with specified security policy rules to redact or otherwise modify secure information within the document before printing. Further, by way of example, controller **102** may be instructed by appropriate security policy rules to require that a user provide an appropriate authentication code, such as a personal identification number or other password codes, to indicate that the user is physically present at the printing system to receive the printed document. Further exemplary rules are discussed herein below with respect to more detailed operation of controller **102**.

[0016] After applying all applicable rules, controller **102** forwards the document (as modified by any applied rules) to the marking engine **108** for imprinting the document on the printable medium. Marking engine **108** thus produces printed document **122** in compliance with the security policy rules applied by controller **102**. Where security policy rules applied by controller **102** specify that an authenticated user must be present to receive the sensitive information of the printed document **122**, the printed document may then be retrieved by the authorized user physically present at the marking engine **108**. Where the security policy rules applied by controller **102** modify or redact sensitive information in the document, printed document **122** will be presented with such modifications as to eliminate sensitive information detected by operations controller **102** based on the security policy rules **104**. Additional details of the operation of system **100** are presented further herein below.

[0017] A security administrative process **106** may be operable in system **100** to provide a user interface for defining or modifying the security policy rules stored in memory **104**. Thus an administrative user of system **100** may define appropriate rules suitable to the types of sensitive information that may appear in a particular printing enterprise application along with suitable actions to assure security of the matching sensitive information.

[0018] Controller **102** of FIG. **1** may be physically embodied in numerous configurations. FIG. **2** is a block diagram of one exemplary embodiment of a controller **202** as a computer system in which a printer driver **204** is operable to apply the security policy rules to received documents before transmitting the documents for printing to the marking engine **108**. FIG. **3** presents another exemplary embodiment in which the controller is a printer controller **302** embedded within the printer **304** that also incorporates the marking engine **108**. Printer **304** is coupled to a computer system **306** that incorporates a driver **308** operable to generate a document to be printed. The document to be printed is then transferred to printer **304** wherein the printer controller **302** applies the security policy rules to assure secure printing of sensitive information in the received document. FIG. **4** shows yet another exemplary embodiment where the controller is a print server **402** adapted to receive a document from computer system **306** generated by printer driver **308**. The print server **402** then applies the security policy rules to the received document to assure secure printing of the document on marking engine **108** with regard to any sensitive information contained within the received document. Those of ordinary skill in the art will readily recognize numerous other physical embodiments of features and aspects hereof wherein a controller receives a document to be printed, applies security policy rules to detect whether sensitive information is present in the received document, and prints the received document in accordance with actions specified by the applicable security policy rules.

[0019] FIG. **5** is a flowchart describing a method in accordance with features and aspects hereof operable within a controller such as controller **102** of FIG. **1**, controller **202** of FIG. **2**, controller **302** of FIG. **3**, and controller **402** of FIG. **4**. Step **500** retrieves or otherwise receives the security policy rules from a memory associated with the controller operation. As discussed further herein below, an exemplary rule may specify a list of words and or phrases that are deemed to represent sensitive information. In addition, each rule may specify corresponding actions to be executed by the controller if any of the words and/or phrases in the list associated with a corresponding rule are found in the document. Details of exemplary actions are discussed further herein below but may include, for example, authentication of a user physically present at the marking engine to receive the printed document that includes sensitive information. Still other exemplary actions may include specified modifications to redact or otherwise modify secure information within the document prior to printing the document on the marking engine. Step **502** then receives a document to be printed from any appropriate source such as a host system driver or application, a spool file from a print server, etc. Step **504** next processes the document in accordance with the retrieved security policy rules to detect the presence of sensitive information in the received document. Step **506** then determines whether the processing of step **504** detected any sensitive information in the received document. If not, step **508** prints the document normally without any required security steps. For example, normal printing may simply involve transferring the received document to the marking engine without requiring any specific user authentication and without any modifications to the content of the document. Conversely, if step **506** determines that sensitive information was detected by the processing of step **504**, step **510** prints the document according to the applicable security policy rules that successfully detected the sensitive information in the received document. Applying the security policy rules may include, for example, authentication of the user as physically present at the marking engine ready to receive the printed document with sensitive information. Additionally, application of the security policy rules may include modifying or redacting portions of the document prior to printing to remove sensitive information from the printed document. Additional exemplary details of processing the print document according to the security policy rules are provided herein below.

[0020] FIG. **6** is a flowchart describing exemplary additional details of the operation of step **504** of FIG. **5** to process a document in accordance with the security policy rules of the printing environment. Step **600** first determines whether the received document contains only text or some portion of

image content. If the document contains only textual information, processing continues at step **604** as discussed below. If the received document contains at least some portion image content or other non-textual information, step **602** may apply optical character recognition (OCR) techniques to image data of the document to attempt to identify additional textual information in the received document. Any text detected by the OCR techniques may be logically appended to the document or in any other manner associated with the document for further processing as described herein below. Text so recognized by the OCR techniques is then processed as other textual information of the document in step **604**.

[0021] Steps **604** through **614** are executed iteratively for each rule of the security policy rules provided in the printing environment. Step **604** starts processing with the first security rule. Step **606** then parses or otherwise processes the textual information of the received document (including any text detected in the document by OCR processing of step **602**) to detect the presence of sensitive information in the text of the document. In general, each security policy rule includes an associated list of words or phrases that are deemed to represent sensitive information in this printing environment. Thus step **606** parses the text of the document comparing words and phrases in the document with the list of sensitive words applicable to the present security policy rule being processed. As noted above and as discussed further below, a user authentication process may be performed as part of a rule by comparing user entered credential information against parameters of the rule. For example, a rule may specify that particular words or phrases are sensitive for one user or class of users but are not sensitive for another user or another class of users.

[0022] Step **608** then determines whether the processing of step **606** detected any such sensitive information for the rule presently being processed. If not, step **614** determines whether more security policy rules remain to be processed. If so, the method loops back to step **604** to get the next security policy rule and continue processing until all security policy rules have been processed. Otherwise, processing of steps **504** is completed.

[0023] If step **608** determines that processing of step **606** detected the presence of sensitive information in accordance with this rule, step **610** next modifies or redacts the content of the document according to the actions of the rule. In general, each rule includes a list of one or more actions to be performed if the sensitive information in the corresponding list is detected as present in the document. Actions to be performed may include, for example, authentication of the user as physically present at that marking engine to receive the printed document containing sensitive information. Further, the actions may include, for example, defined modifications to the content of the document to redact or otherwise modify the sensitive information. Still further, for example, an action may specify that entire portions of the document that are detected as including sensitive information be removed when the document is printed. Specific modifications or redactions to the document content may be performed by step **610**. Other actions that require input from the user to authenticate the user's presence at the printer may be performed later when the document is transferred to the marking engine. Thus, step **612** adds the present rule to a list of rules to be applied later when the document is printed on the marking engine. Processing then continues at step **614** as discussed above to determine whether additional rules remain to be checked. If so processing loops back to step **604**. Otherwise processing of step **504** is complete.

[0024] FIG. **7** is a flowchart describing exemplary additional details of the processing of step **510** of FIG. **5** to print the document (i.e., transfer the document to the marking engine) in accordance with the security policy rules added to the list of rules that detected sensitive information in the document. As noted above, some actions to be performed by a particular rule added to the list need to be performed at the time the document is transferred to the marking engine. Other rules may have previously modified the document content so as to redact sensitive information or otherwise modify the content of the document. Step **700** retrieves the list of rules to be applied in printing of the document as were previously saved in the processing of step **504** of FIGS. **5** and **6**. Step **702** then determines whether the list of rules to be applied includes any rule requiring entry of a user authentication code to identify the user as an authorized user physically present at the marking engine to receive the printed document. If such rules are contained in the list of rules to be applied, step **704** performs the specified actions in the applicable rules to await receipt of a correct user authentication code indicating that the authorized user is physically present at the marking engine to receive the print a document. Any suitable user input device may be utilized in association with the marking engine to permit the user to enter an appropriate authentication code or password indicating that the user is physically present and ready to receive the document containing sensitive information. Processing then continues at step **706**.

[0025] Step **706** next determines whether the list of rules to be applied at printing of the document includes any rules that restrict portions of the documents from being printed. For example, in conjunction with entry of a user authentication code, particular codes may indicate different levels of security to be applied for purposes of restricting what portions of the document may be printed. If so, step **708** then sets suitable indicia or variables to indicate portions of the document to be restricted from printing. Entire sequences of pages or portions of pages may be so limited or restricted from printing of the document on the marking engine. Processing then continues at step **710**.

[0026] Step **710** then determines whether the list of rules to be applied in printing the document includes any rules that may modify parameters of the printing of the document. For example, a rule may specify an action that a particular document including sensitive information should be printed on certain printable medium or must be printed using certain colors or toners, etc. If so, step **712** adjusts printing parameters as specified by the actions of the applicable rules in the list of rules to be applied during printing. Processing then continues at step **714**.

[0027] Step **714** then determines whether any actions are specified in the list of rules to be applied indicate that the printing of the document is to be logged. If so, step **716** logs appropriate information regarding the document as it will be printed. The log information may include, for example, the user authentication information indicating which user was identified as physically present at the printer at the time of printing to receive the document, which portions of the document were actually printed, which rules were applied to restrict the sensitive information in the printed document, etc. Such log information may be stored in a suitable memory within the controller or forwarded to an administrative process associated with the controller for suitable archiving. Processing then continues at step **718**.

[0028] Lastly, step **718** prints the unrestricted portions of the document, as modified and/or redacted in accordance with the rules, and in accordance with any changes to the printing parameters. The document as so modified and/or redacted is then printed by the marking engine and thus presented to an authorized user.

[0029] Those of ordinary skill in the art will readily recognize numerous additional and equivalent steps that may be performed in the methods of FIGS. **5** through **7**. Such additional and equivalent steps are omitted for simplicity and brevity of this discussion.

[0030] Embodiments of the invention can take the form of an entirely hardware embodiment, an entirely software embodiment or an embodiment containing both hardware and software elements. In a preferred embodiment, the invention is implemented in software, which includes but is not limited to firmware, resident software, microcode, etc. FIG. **8** is a block diagram depicting a printing system **801** as a system adapted to provide features and aspects hereof by executing programmed instructions and accessing data stored on a computer readable storage medium **812**.

[0031] Furthermore, the invention can take the form of a computer program product accessible from a computer-usable or computer-readable medium **812** providing program code for use by or in connection with a computer or any instruction execution system. For the purposes of this description, a computer-usable or computer readable medium can be any apparatus that can contain, store, communicate, propagate, or transport the program for use by or in connection with the instruction execution system, apparatus, or device.

[0032] The medium can be an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system (or apparatus or device) or a propagation medium. Examples of a computer-readable medium include a semiconductor or solid state memory, magnetic tape, a removable computer diskette, a random access memory (RAM), a read-only memory (ROM), a rigid magnetic disk and an optical disk. Current examples of optical disks include compact disk-read only memory (CD-ROM), compact disk-read/write (CD-R/W) and DVD.

[0033] A data processing system suitable for storing and/or executing program code will include at least one processor **800** coupled directly or indirectly to memory elements **802** through a system bus **850**. As noted above, processors may be distributed among various control elements of a printing system such as in a rasterizing printer controller and a page extractor post-processing element. The memory elements can include local memory employed during actual execution of the program code, bulk storage, and cache memories which provide temporary storage of at least some program code in order to reduce the number of times code must be retrieved from bulk storage during execution.

[0034] Input/output or I/O devices **804** (including but not limited to keyboards, displays, pointing devices, etc.) can be coupled to the system either directly or through intervening I/O controllers. Network adapter interfaces **806** may also be coupled to the system to enable the data processing system to become coupled to other data processing systems or storage devices through intervening private or public networks. Modems, cable modems, IBM Channel attachments, SCSI, Fibre Channel, and Ethernet cards are just a few of the currently available types of network or host interface adapters.

[0035] While the invention has been illustrated and described in the drawings and foregoing description, such illustration and description is to be considered as exemplary and not restrictive in character. Various embodiments of the invention and minor variants thereof have been shown and described. In particular, those of ordinary skill in the art will readily recognize that exemplary methods discussed above may be implemented as suitably programmed instructions executed by a general or special purpose programmable processor or may be implemented as equivalent custom logic circuits including combinatorial and/or sequential logic elements. Protection is desired for all changes and modifications that come within the spirit of the invention. Those skilled in the art will appreciate variations of the above-described embodiments that fall within the scope of the invention. As a result, the invention is not limited to the specific examples and illustrations discussed above, but only by the following claims and their equivalents.

What is claimed is:

1. A method for securing the printing of documents including sensitive information, the method comprising:
- providing security policy rules for printing of documents including sensitive information;
- automatically detecting the presence of sensitive information in a document to be printed based on the rules; and
- printing the document, responsive to detecting the presence of sensitive information, according to the security policy rules to secure the sensitive information from unauthorized use.

2. The method of claim **1**
- wherein the step of automatically detecting further comprises:
- parsing text in the document to identify words included therein;
- comparing the indentified words to a list of sensitive words; and
- detecting the presence of sensitive information when any of the identified words is found in the list of sensitive words.

3. The method of claim **1**
- wherein the step of automatically detecting further comprises:
- applying optical character recognition to image data included in the document to identify words included in the image data of the document;
- comparing the indentified words to a list of sensitive words; and
- detecting the presence of sensitive information when any of the identified words is found in the list of sensitive words.

4. The method of claim **1**
- wherein the security policy rules include requiring an authorized user to enter an authentication code before the document will be printed, and
- wherein the step of printing further comprises:
- awaiting receipt of the authentication code at the printer before commencing printing of the document.

5. The method of claim **4**
- wherein the security policy rules include associating a level of access indicia with each of multiple types of the sensitive information,
- wherein the authentication code includes a level of access indicia and includes an associated password, and
- wherein the step of printing further comprises:
- varying the portions of the document to be printed based on the level of access indicia provided as input by the user.

6. The method of claim **1**
- wherein the security policy rules include automatically redacting portions of the document including sensitive information prior to printing the document.

7. The method of claim **1**
- wherein the security policy rules include logging printing of the document.

8. A system comprising:
a marking engine for imprinting information on a printable medium;
a controller coupled to the marking engine for controlling the printing of documents including sensitive information on the marking engine; and
a memory, coupled to the controller, storing security policy rules for printing of documents including sensitive information,
wherein the controller is adapted to automatically detect the presence of sensitive information in a document to be printed based on the rules, and
wherein the controller is adapted to print the document, responsive to detecting the presence of sensitive information, according to the security policy rules to secure the sensitive information from unauthorized use.

9. The system of claim **8**
wherein the controller further comprises a printer driver operable in a computer system coupled to the marking engine.

10. The system of claim **8**
wherein the controller further comprises a printer controller coupled to a computer system and coupled to the marking engine wherein the computer system generates the document to be printed.

11. The system of claim **8**
wherein the controller further comprises a print server coupled to a computer system and coupled to the marking engine wherein the computer system generates the document to be printed.

12. The system of claim **8**
wherein the security policy rules include requiring an authorized user to enter a authentication code before the document will be printed, and
wherein the controller is further adapted to await receipt of the authentication code at the printer before commencing printing of the document.

13. The system of claim **12**
wherein the security policy rules include associating a level of access indicia with each of multiple types of the sensitive information,
wherein the authentication code includes a level of access indicia and includes an associated password, and
wherein the controller is further adapted to vary the portions of the document to be printed based on the level of access indicia provided as input by the user.

14. The system of claim **8**
wherein the security policy rules include indicia of portions of the document including sensitive information to be redacted, and
wherein the controller is further adapted to redact the portions of the document to be printed prior to printing the document.

15. The system of claim **8**
wherein the security policy rules include indicia that printing of the document should be logged, and
wherein the controller is further adapted to log the printing of the document.

16. A computer readable medium tangibly embodying programmed instructions which, when executed on a computer system, perform a method for securing the printing of documents including sensitive information, the method comprising:
providing security policy rules for printing of documents including sensitive information;
automatically detecting the presence of sensitive information in a document to be printed based on the rules; and
printing the document, responsive to detecting the presence of sensitive information, according to the security policy rules to secure the sensitive information from unauthorized use.

17. The medium of claim **16**
wherein the step of automatically detecting further comprises:
parsing text in the document to identify words included therein;
comparing the indentified words to a list of sensitive words; and
detecting the presence of sensitive information when any of the identified words is found in the list of sensitive words.

18. The medium of claim **16**
wherein the step of automatically detecting further comprises:
applying optical character recognition to image data included in the document to identify words included in the image data of the document;
comparing the indentified words to a list of sensitive words; and
detecting the presence of sensitive information when any of the identified words is found in the list of sensitive words.

19. The medium of claim **16**
wherein the security policy rules include requiring an authorized user to enter an authentication code before the document will be printed, and
wherein the step of printing further comprises:
awaiting receipt of the authentication code at the printer before commencing printing of the document.

20. The medium of claim **19**
wherein the security policy rules include associating a level of access indicia with each of multiple types of the sensitive information,
wherein the authentication code includes a level of access indicia and includes an associated password, and
wherein the step of printing further comprises:
varying the portions of the document to be printed based on the level of access indicia provided as input by the user.

21. The medium of claim **16**
wherein the security policy rules include automatically redacting portions of the document including sensitive information prior to printing the document.

22. The medium of claim **16**
wherein the security policy rules include logging printing of the document.

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